

SEQUENCE LISTING

<110> Huston, James S.
Wils, Pierre
Zhu, Quan
Laurent, Olivier
Marasco, Wayne A.
Scherman, Daniel

<120> BIOENGINEERED VEHICLES FOR TARGETED NUCLEIC ACID
DELIVERY

<130> 23611-A USA

<140> As yet unassigned

<141> 2001-06-25

<150> 60/213,653

<151> 2000-06-23

<160> 45

<170> PatentIn Ver. 2.0

<210> 1

<211> 18

<212> PRT

<213> Homo sapiens

<400> 1

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1 5 10 15

Arg Arg

<210> 2

<211> 26

<212> PRT

<213> Homo sapiens

<400> 2

Ala Lys Lys Ala Lys Ser Pro Lys Lys Ala Lys Ala Ala Lys Pro Lys
1 5 10 15

Lys Ala Pro Lys Ser Pro Ala Lys Ala Lys
20 25

Ja13

09688721 065501

<400> 7

Lys Cys Asp Ser Thr Leu Arg Leu Cys Val Gln Ser Thr His Val Ile
1 5 10 15

Arg Thr Leu

<210> 8
<211> 10
<212> PRT
<213> Human papillomavirus

<400> 8
Gly Thr Leu Gly Ile Val Cys Pro Ile Cys
1 5 10

<210> 9
<211> 10
<212> PRT
<213> Epstein-Barr Virus

<400> 9
Asp Thr Pro Leu Ile Pro Leu Thr Ile Phe
1 5 10

<210> 10
<211> 15
<212> PRT
<213> Epstein-Barr Virus

<400> 10
Pro Arg Ser Pro Thr Val Phe Tyr Asn Ile Pro Pro Met Pro Leu
1 5 10 15

<210> 11
<211> 9
<212> PRT
<213> Epstein-Barr Virus

<400> 11
Phe Leu Arg Gly Arg Ala Tyr Gly Leu
1 5

<210> 12

090901 060001

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<400> 16
Lys Leu Val Val Val Gly Ala Arg Gly Val Gly Lys Ser
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<210> 17
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<212> PRT
<213> Homo sapiens

<400> 17
Lys Leu Val Val Val Gly Ala Val Gly Val Gly Lys
1 5 10

<210> 18
<211> 16
<212> PRT
<213> Homo sapiens

<400> 18
Asp Ile Leu Asp Thr Ala Gly Leu Glu Glu Tyr Ser Ala Met Arg Asp
1 5 10 15

<210> 19
<211> 8
<212> PRT
<213> Homo sapiens

<400> 19
Gly Leu Glu Glu Tyr Ser Ala Met
1 5

<210> 20
<211> 10
<212> PRT
<213> Homo sapiens

<400> 20
Glu Leu Val Ser Glu Phe Ser Arg Met Ala
1 5 10

<210> 21
<211> 15
<212> PRT
<213> Homo sapiens

<400> 21
His Leu Asp Met Leu Arg His Leu Tyr Gln Gly Cys Gln Val Val

09060721.063501
T09060721.063501

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<400> 22
Ser Arg Leu Leu Gly Ile Cys Leu Thr Ser Thr Val Gln Leu Val
1 5 10 15

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<400> 23
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<400> 24
Leu Leu Asp Gly Thr Ala Thr Leu Arg Leu
  1                      5                10
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<400> 25
Tyr Leu Glu Pro Gly Pro Val Thr Ala
1 5

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<210> 26
<211> 9
<212> PRT
<213> Homo sapiens
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000007-000000

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<213> Homo sapiens

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<213> Homo sapiens

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<213> Homo sapiens

15

20

<213> Simian virus 40

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<210> 31
<211> 14
<212> PRT
<213> Homo sapiens

<400> 31
Lys Lys Ser Ala Lys Lys Thr Pro Lys Lys Ala Lys Lys Pro
1 5 10

<210> 32
<211> 26
<212> PRT
<213> Homo sapiens

<400> 32
Ala Lys Lys Ala Lys Ser Pro Lys Lys Ala Lys Ala Ala Lys Pro Lys
1 5 10 15

Lys Ala Pro Lys Ser Pro Ala Lys Ala Lys
20 25

<210> 33
<211> 18
<212> PRT
<213> Homo sapiens

<400> 33
Ser Arg Ser Arg Tyr Tyr Arg Gln Arg Gln Arg Ser Arg Arg Arg Arg
1 5 10 15

Arg Arg

<210> 34
<211> 255
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Human/murine
chimeric single chain binding polypeptide (C6.5
sFv)

<400> 34
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090909 12/09/99

	1				5					10						15
Ser	Leu	Lys	Ile	Ser	Cys	Lys	Gly	Ser	Gly	Tyr	Ser	Phe	Thr	Ser	Tyr	
			20					25					30			
Trp	Ile	Ala	Trp	Val	Arg	Gln	Met	Pro	Gly	Lys	Gly	Leu	Glu	Tyr	Met	
		35					40					45				
Gly	Leu	Ile	Tyr	Pro	Gly	Asp	Ser	Asp	Thr	Lys	Tyr	Ser	Pro	Ser	Phe	
	50					55					60					
Gln	Gly	Gln	Val	Thr	Ile	Ser	Val	Asp	Lys	Ser	Val	Ser	Thr	Ala	Tyr	
	65				70					75					80	
Leu	Gln	Trp	Ser	Ser	Leu	Lys	Pro	Ser	Asp	Ser	Ala	Val	Tyr	Phe	Cys	
				85					90					95		
Ala	Arg	His	Asp	Val	Gly	Tyr	Cys	Ser	Ser	Ser	Asn	Cys	Ala	Lys	Trp	
			100					105					110			
Pro	Glu	Tyr	Phe	Gln	His	Trp	Gly	Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	
		115					120					125				
Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	
	130					135					140					
Gln	Ser	Val	Leu	Thr	Gln	Pro	Pro	Ser	Val	Ser	Ala	Ala	Pro	Gly	Gln	
145					150					155					160	
Lys	Val	Thr	Ile	Ser	Cys	Ser	Gly	Ser	Ser	Ser	Asn	Ile	Gly	Asn	Asn	
				165					170					175		
Tyr	Val	Ser	Trp	Tyr	Gln	Gln	Leu	Pro	Gly	Thr	Ala	Pro	Lys	Leu	Leu	
			180					185					190			
Ile	Tyr	Gly	His	Thr	Asn	Arg	Pro	Ala	Gly	Val	Pro	Asp	Arg	Phe	Ser	
	195						200					205				
Gly	Ser	Lys	Ser	Gly	Thr	Ser	Ala	Ser	Leu	Ala	Ile	Ser	Gly	Phe	Arg	
	210					215					220					
Ser	Glu	Asp	Glu	Ala	Asp	Tyr	Tyr	Cys	Ala	Ala	Trp	Asp	Asp	Ser	Leu	
225					230				235						240	
Ser	Gly	Trp	Val	Phe	Gly	Gly	Gly	Thr	Lys	Leu	Thr	Val	Leu	Gly		
				245					250					255		

<400> 36

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1 5 10 15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Tyr
20 25 30

Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Tyr Met
35 40 45

Gly Leu Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
50 55 60

Gln	Gly	Gln	Val	Thr	Ile	Ser	Val	Asp	Lys	Ser	Val	Ser	Thr	Ala	Tyr	65	70	75	80
Leu	Gln	Trp	Ser	Ser	Leu	Lys	Pro	Ser	Asp	Ser	Ala	Val	Tyr	Phe	Cys	85	90	95	
Ala	Arg	His	Asp	Val	Gly	Tyr	Cys	Ser	Ser	Ser	Asn	Cys	Ala	Lys	Trp	100	105	110	
Pro	Glu	Tyr	Phe	Gln	His	Trp	Gly	Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	115	120	125	
Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	130	135	140	
Gln	Ser	Val	Leu	Thr	Gln	Pro	Pro	Ser	Val	Ser	Ala	Ala	Pro	Gly	Gln	145	150	155	160
Lys	Val	Thr	Ile	Ser	Cys	Ser	Gly	Ser	Ser	Ser	Asn	Ile	Gly	Asn	Asn	165	170	175	
Tyr	Val	Ser	Trp	Tyr	Gln	Gln	Leu	Pro	Gly	Thr	Ala	Pro	Lys	Leu	Leu	180	185	190	
Ile	Tyr	Asp	His	Thr	Asn	Arg	Pro	Ala	Gly	Val	Pro	Asp	Arg	Phe	Ser	195	200	205	
Gly	Ser	Lys	Ser	Gly	Thr	Ser	Ala	Ser	Leu	Ala	Ile	Ser	Gly	Phe	Arg	210	215	220	
Ser	Glu	Asp	Glu	Ala	Asp	Tyr	Tyr	Cys	Ala	Ser	Trp	Asp	Tyr	Thr	Leu	225	230	235	240
Ser	Gly	Trp	Val	Phe	Gly	Gly	Gly	Thr	Lys	Leu	Thr	Val	Leu	Gly	Ala	245	250	255	
Ala	Ala	His	His	His	His	His	His	Gly	Gly	Gly	Gly	Cys				260	265		

<210> 37

<211> 807

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human/murine
chimeric single chain binding polypeptide (C6ML3-9

sFv')

<400> 37

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cccgggaaag gcctggagta catggggctc atctatcctg gtgactctga caccaaatac 180
agcccgtcct tccaaggcca ggtcaccatc tcagtcgaca agtccgtcag cactgcctac 240
ttgcaatgga gcagtctgaa gccctcggac agcgccgtgt atttttgtgc gagacatgac 300
gtgggatatt gcagtagttc caactgcgca aagtggcctg aatacttcca gcattggggc 360
cagggcaccc tggtcaccgt ctccctcaggt ggaggcggtt caggcggagg tggctctggc 420
gggtggcggt cgcagtctgt gttgacgcag ccgccctcag tgtctgcggc cccaggacag 480
aaggtcacca tctcctgctc tggaagcagc tccaacattg ggaataatta tgtatcctgg 540
taccagcagc tcccaggaac agccccaaa ctccctcatct atgatcacac caatcgcccc 600
gcaggggtcc ctgaccgatt ctctggctcc aagtctggca cctcagcctc cctggccatc 660
agtgggttcc ggtccgagga tgaggctgat tattactgtg cctcctggga ctacaccctc 720
tcgggctggg tgttcggcgg aggaaccaag ctgaccgtcc taggtgcggc cgcacaccat 780
catcaccatc acggtgggtg cggtgc 807
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<210> 38

<211> 282

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human/murine
chimeric single chain binding polypeptide
(C6ML-3-9sFv'-L1-KDEL)

<400> 38

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Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
  1                      5                      10                     15

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Tyr
      20                      25                     30

Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Tyr Met
      35                      40                     45

Gly Leu Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
      50                      55                     60

Gln Gly Gln Val Thr Ile Ser Val Asp Lys Ser Val Ser Thr Ala Tyr
      65                      70                     75                     80

Leu Gln Trp Ser Ser Leu Lys Pro Ser Asp Ser Ala Val Tyr Phe Cys
      85                      90                     95

Ala Arg His Asp Val Gly Tyr Cys Ser Ser Ser Asn Cys Ala Lys Trp
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109888721.066504

<210> 39

<212> DNA

<220>

<400> 39

caggtgcagc tggtgcagtc tggggcagag gtgaaaaagc ccggggagtc tctgaagatc 60

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cccggaagaa gcttgagta catggggctc atctatcctg gtgactctga caccaaatac 180
agcccgctct tccaaggcca ggtcaccatc tcagtcgaca agtccgtcag cactgcctac 240
ttgcaatgga gcagtctgaa gccctcggac agcgccgtgt atttttgtgc gagacatgac 300
gtgggatatt gcagtagttc caactgcgca aagtggcctg aatacttcca gcattggggc 360
cagggcaccc tggtcaccgt ctctcaggt ggaggcgggt caggcggagg tggctctggc 420
ggtggcggat cgcagtctgt gttgacgcag ccgccctcag tgtctgcggc ccaggacag 480
aaggtcacca tctctgctc tgggaagcag tccaacattg ggaataatta tgtatcctgg 540
taccagcagc tcccaggaac agcccccaaa ctctcatct atgatcacac caatcgcccc 600
gcaggggtcc ctgaccgatt ctctggctcc aagtctggca cctcagcctc cctggccatc 660
agtgggttcc ggtccgagga tgaggctgat tattactgtg cctcctggga ctacaccctc 720
tcgggctggg tggtcggcgg aggaaccaag ctgaccgtcc taggtgcggc cgcacaccat 780
catcaccatc acggtggtgg cggctgcctc gagtcctcta gctctggatc cgaaaaagat 840
gaactg                                         846

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<210> 40

<211> 287

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Human/murine
chimeric single chain binding polypeptide
(C6ML3-9sFv'-L2-KDEL)

<400> 40

```

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
  1             5             10             15

```

```

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Tyr
          20             25             30

```

```

Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Tyr Met
      35             40             45

```

```

Gly Leu Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
  50             55             60

```

```

Gln Gly Gln Val Thr Ile Ser Val Asp Lys Ser Val Ser Thr Ala Tyr
  65             70             75             80

```

```

Leu Gln Trp Ser Ser Leu Lys Pro Ser Asp Ser Ala Val Tyr Phe Cys
          85             90             95

```

```

Ala Arg His Asp Val Gly Tyr Cys Ser Ser Ser Asn Cys Ala Lys Trp
      100             105             110

```

```

Pro Glu Tyr Phe Gln His Trp Gly Gln Gly Thr Leu Val Thr Val Ser

```

0988721-06301

125

Ser Ser Ser Gly Ser Ser Ser Ser Gly Ser Glu Lys Asp Glu Leu
275 280 285

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tcctgtaagg	gttctggata	cagctttacc	agctactgga	tcgcctgggt	gcgccagatg	120
cccgggaaag	gcctggagta	catggggctc	atctatcctg	gtgactctga	caccaaatac	180
aqccctcctt	tccaaqcca	ggtcaccatc	tcagtcgaca	agtcctcag	cactgcctac	240

1. The first step is to identify the problem or question that needs to be addressed. This involves understanding the context and the specific requirements of the task.

```

ttgcaatgga gcagtctgaa gccctcggac agcgccgtgt atttttgtgc gagacatgac 300
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cagggcaccc tggtcaccgt ctctcaggt ggaggcgggt caggcggagg tggctctggc 420
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aaggtcacca tctcctgctc tggaagcagc tccaacattg ggaataatta tgtatcctgg 540
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gcaggggtcc ctgaccgatt ctctggctcc aagtctggca cctcagcctc cctggccatc 660
agtgggttcc ggtccgagga tgaggctgat tattactgtg cctcctggga ctacaccctc 720
tcgggctggg tggtcggcgg aggaaccaag ctgaccgtcc taggtgcggc cgcacaccat 780
catcaccatc acggtggtgg cggctgcctc gagtctagca gctccggttc ctctagctct 840
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<210> 42

<211> 296

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Human/murine
chimeric single chain binding polypeptide
(C6ML3-9sFv'-L2-H14)

<400> 42

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Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
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```

```

Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Tyr
      20                   25                   30

```

```

Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Tyr Met
      35                   40                   45

```

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Gly Leu Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
      50                   55                   60

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```

Gln Gly Gln Val Thr Ile Ser Val Asp Lys Ser Val Ser Thr Ala Tyr
      65                   70                   75                   80

```

```

Leu Gln Trp Ser Ser Leu Lys Pro Ser Asp Ser Ala Val Tyr Phe Cys
      85                   90                   95

```

```

Ala Arg His Asp Val Gly Tyr Cys Ser Ser Ser Asn Cys Ala Lys Trp
      100                   105                   110

```

```

Pro Glu Tyr Phe Gln His Trp Gly Gln Gly Thr Leu Val Thr Val Ser
      115                   120                   125

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```

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser

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T05260.T2299550

130		135		140
Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln				
145		150		155 160
Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn				
	165		170	175
Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu				
	180		185	190
Ile Tyr Asp His Thr Asn Arg Pro Ala Gly Val Pro Asp Arg Phe Ser				
	195		200	205
Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Phe Arg				
	210		215	220
Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Asp Tyr Thr Leu				
	225		230	235 240
Ser Gly Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Ala				
	245		250	255
Ala Ala His His His His His His Gly Gly Gly Gly Cys Leu Glu Ser				
	260		265	270
Ser Ser Ser Gly Ser Ser Ser Ser Gly Ser Lys Lys Ser Ala Lys Lys				
	275		280	285
Thr Pro Lys Lys Ala Lys Lys Pro				
	290		295	

<210> 43
 <211> 888
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Human/murine
 chimeric single chain binding polypeptide
 (C6ML3-9sFv'-L2-H14)

<400> 43
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 cccgggaaag gcctggagta catggggctc atctatcctg gtgactctga caccaaatac 180
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09090724.000001

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<210> 44
<211> 291
<212> PRT
<213> Artificial Sequence
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<223> Description of Artificial Sequence:Human/murine
chimeric single chain binding polypeptide
(C6ML3-9sFv'-L2-nls)

Gln	Val	Gln	Leu	Val	Gln	Ser	Gly	Ala	Glu	Val	Lys	Lys	Pro	Gly	Glu	
1				5					10					15		
Ser	Leu	Lys	Ile	Ser	Cys	Lys	Gly	Ser	Gly	Tyr	Ser	Phe	Thr	Ser	Tyr	
			20					25					30			
Trp	Ile	Ala	Trp	Val	Arg	Gln	Met	Pro	Gly	Lys	Gly	Leu	Glu	Tyr	Met	
		35					40					45				
Gly	Leu	Ile	Tyr	Pro	Gly	Asp	Ser	Asp	Thr	Lys	Tyr	Ser	Pro	Ser	Phe	
	50					55					60					
Gln	Gly	Gln	Val	Thr	Ile	Ser	Val	Asp	Lys	Ser	Val	Ser	Thr	Ala	Tyr	
65					70					75					80	
Leu	Gln	Trp	Ser	Ser	Leu	Lys	Pro	Ser	Asp	Ser	Ala	Val	Tyr	Phe	Cys	
			85						90					95		
Ala	Arg	His	Asp	Val	Gly	Tyr	Cys	Ser	Ser	Ser	Asn	Cys	Ala	Lys	Trp	
			100					105					110			
Pro	Glu	Tyr	Phe	Gln	His	Trp	Gly	Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	
		115					120					125				
Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	

130

135

140

Gln Ser Val Leu Thr Gln Pro Pro Ser Val Ser Ala Ala Pro Gly Gln
145 150 155 160

Lys Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Asn Asn
165 170 175

Tyr Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
180 185 190

Ile Tyr Asp His Thr Asn Arg Pro Ala Gly Val Pro Asp Arg Phe Ser
195 200 205

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Phe Arg
210 215 220

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Ser Trp Asp Tyr Thr Leu
225 230 235 240

Ser Gly Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Ala
245 250 255

Ala Ala His His His His His His Gly Gly Gly Gly Cys Leu Glu Ser
260 265 270

Ser Ser Ser Gly Ser Ser Ser Ser Gly Ser Thr Pro Pro Lys Lys Lys
275 280 285

Arg Lys Val
290

<210> 45

<211> 873

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Human/murine
chimeric single chain binding polypeptide
(C6ML3-9sFv'-L2-nls)

<400> 45

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cccgggaaag gcctggagta catggggctc atctatcctg gtgactctga caccaaatac 180
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09633724.066504
T062290" T2/83360

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cagggcaccc	tggtcacctg	ctcctcaggt	ggaggcggtt	caggcggagg	tggtctctggc	420
ggtggcggat	cgcagtcctgt	gttgacgcag	ccgccctcag	tgtctgcggc	cccaggacag	480
aaggtcacca	tctcctgctc	tggaagcagc	tccaacattg	ggaataatta	tgtatcctgg	540
taccagcagc	tcccaggaac	agcccccaaa	ctcctcatct	atgatcacac	caatcggccc	600
gcaggggtcc	ctgaccgatt	ctctggctcc	aagtctggca	cctcagcctc	cctggccatc	660
agtgggttcc	ggtccgagga	tgaggctgat	tattactgtg	cctcctggga	ctacaccctc	720
tcgggctggg	tgttcggcgg	aggaaccaag	ctgaccgtcc	taggtgcggc	cgcacaccat	780
catcaccatc	acggtggtgg	cggctgcctc	gagtctagca	gctccggttc	ctctagctct	840
ggatccactc	cgccgaaaaa	gaaacgtaaa	gtg			873

1. *Pharmaceutical industry*: The pharmaceutical industry is a major player in the healthcare sector, responsible for the development, production, and distribution of drugs. It is a highly regulated industry with significant barriers to entry, including high R&D costs and complex regulatory requirements. The industry is characterized by a high concentration of large, multinational corporations.